



MARTIN[®] Typhoon Air Cannon



Installation Instructions
M3813UK

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2 Introduction

2.1 About these installation instructions

Non-compliance with these installation instructions can result in loss of compensation for damage and/or warranty claims.

2.1.1 Scope

These installation instructions apply solely for the product described herein and are intended for those persons who install this product, commission it, and monitor its usage.

2.1.2 Copyright

The products described and these installation instructions are protected by copyright. Any reproduction without a licence will be prosecuted. All rights to the present document are reserved, including its reproduction and/or copying in any conceivable manner. Reprints of this document require the written consent of Martin Engineering.

The technical standard at the time of delivery of the product and its technical documentation are decisive as long as no other information is provided. The product and documentation are subject to technical changes without prior notification. Earlier documents then lose their validity. Martin Engineering's General Terms of Sales and Delivery shall apply.

2.1.3 Exclusion of liability

Martin Engineering guarantees the flawless function of its product in accordance with its advertising, the published product information, and its technical documentation. Martin Engineering shall assume no liability for efficiency and flawless function if the product is used for a purpose other than that described in the "Intended Use" section or for damage resulting from the use of accessories and/or spare parts which were not supplied and/or certified by Martin Engineering.

Martin Engineering products are designed for a long service life. They conform to the state of the art in science and technology and were thoroughly inspected before shipment. In addition to this, Martin Engineering constantly performs product and market research for continuous product development.

Martin Engineering offers competent support whenever malfunctions and/or technical problems occur. Suitable actions are taken immediately. The warranty provisions of Martin Engineering apply and can be sent to you as needed.

2.1.4

Reference to additional documents

Reference is made in these installation instructions to the following documents:

- MARTIN® air cannons, nozzles and flange brackets - Installation instructions - M3773

The following standards and directives were complied with in the preparation of these installation instructions:

- Machinery Directive (2006/42/EC)
- EU - Directive, Simple unfired pressure vessels 2014/29/EU
- EU Pressure Vessel Directive (2014/68/EU)
- ISO/IEC Guide 37 "Installation instructions for products used by consumers", 1995 Edition
- DIN 1421 "Arrangement and numbering in texts", Edition 1983-01
- DIN/EN 12100 "Machine safety - basic definitions, general design guidelines", Edition 2013-08
- DIN/ISO 16016 "Technical product documentation - Protection notices for restricting the use of documents and products", Edition 2007-12
- DIN EN 953 "Machine Safety- Safeguards - General requirements on the design and construction of stationary and mobile safeguards".
- DIN EN 4414:2011-04 "Fluid technology - General rules and safety-related requirements for pneumatic systems and their component parts."
- DIN/EN 60204-1 "Safety of machines - Electrical Equipment of Machines, Part 1 General requirements", Edition 1998-11
- DIN EN 82079-1 - Creation of user manuals - Structuring, content and presentation, Part 1 General principles and detailed requirements.

2.1.5

Classification of the hazards

**DANGER!**

Represents an immediately threatening danger which leads to serious bodily injuries or death if not avoided.

**WARNING!**

Represents a possibly hazardous situation which could lead to serious bodily injuries or death if not avoided.

**CAUTION!**

Represents a possibly hazardous situation which could lead to minor bodily injuries and/or property damage if not avoided.

**NOTE**

Contains comments about the installation and/or the product's usage to point out situations which cause neither personal injury nor property damage but include important information.

2.2 Intended usage

MARTIN® Typhoon cannons (abbreviated as air cannon) are used for the removal of clinging materials from bulk material, storage and transport containers. Depending on the model type, they can be used on bulk material containers or smoke channels with an internal temperature up to 1370° C.

Air cannons may only be used in certain ambient temperature ranges which are specified on their nameplates. For this, see also Section 3.4 "Manufacturer and model numbers".

Every other usage of this product is deemed as misuse. Please contact Martin Engineering customer service if you would like to use this product for a different purpose. We will be happy to assist you with the product configuration.

2.2.1 Usage in explosion-protected areas

This product can also be used in potentially explosive areas under certain conditions. Contact Martin Engineering for more information on usage in potentially explosive areas.

2.2.2 Restrictions on the use of the product

The product specified here may only be used within the scope of the specifications referred to above. Usage in a higher equipment protection category or under other operating conditions than those specified by Martin Engineering shall be deemed misuse and is only permitted if approved by Martin Engineering.

Martin Engineering or one of its representatives can assist you with the product configuration if you need to use this product for a different purpose.

2.3 Occupational safety

2.3.1 Safety information, occupational safety

These installation instructions must be read through in their entirety before work may be started on the product or on the conveyor system supplied by the customer.

The owner-operator must ensure that all installation, inspection and maintenance work is performed solely by trained specialists.

Work on conveyor systems and their accessories must always be performed during shut-down. The procedures described in the applicable installation instructions for shutting down-the conveyor system must always be complied with.

All of the safety devices and safeguards must be reattached and/or made operational again immediately following completion of the work.

The installation must be carried out to completion before the system is started up. The flawless execution of all operating steps must be tested before the conveyor system can be started up again. Please observe all information on the installation and start-up of the product.

2.3.2 Duties of the owner-operator

This product's owner-operator must ensure that this product is installed, serviced and used solely by those persons who

- know the rules regarding occupational safety and accident prevention,
- were trained on using this product and have read and understood these installation instructions.

2.3.3 Authorised personnel

Personnel are considered authorised when they have suitable training and technical experience, can demonstrate knowledge of the applicable standards and guidelines, and are able to evaluate tasks in order to recognise critical situations at an early stage.

Operating, maintenance and installation personnel

Personnel are considered authorised when they have been trained on using the product and have read and understood these operating instructions in their entirety.

3 Description of the product

3.1 Design and function

The air cannon is used to dissolve baked-on materials, arch formation, rat holes and other types of build-ups. The air cannon achieves this by "pressing" air through pipes or special nozzles into the bulk container or, for example, in smoke ducts. This eliminates the build-ups and restores trouble-free material flow.



NOTE

Martin Engineering assumes no liability for damage to the owner-operator's system caused by improper installation of the air cannon. Only a qualified technicians shall be permitted to proceed with installation and maintenance tasks.

If you have any questions, please contact Martin Engineering or an authorised dealership.



DANGER!

Any other cleaning techniques used such as compressed CO₂, water lances or other cleaning techniques in connection with the use of the air cannons must be protected against pressure waves due to air or high water pressure by additional safety devices such as shut-off dampers .

3.2 Functional sequence

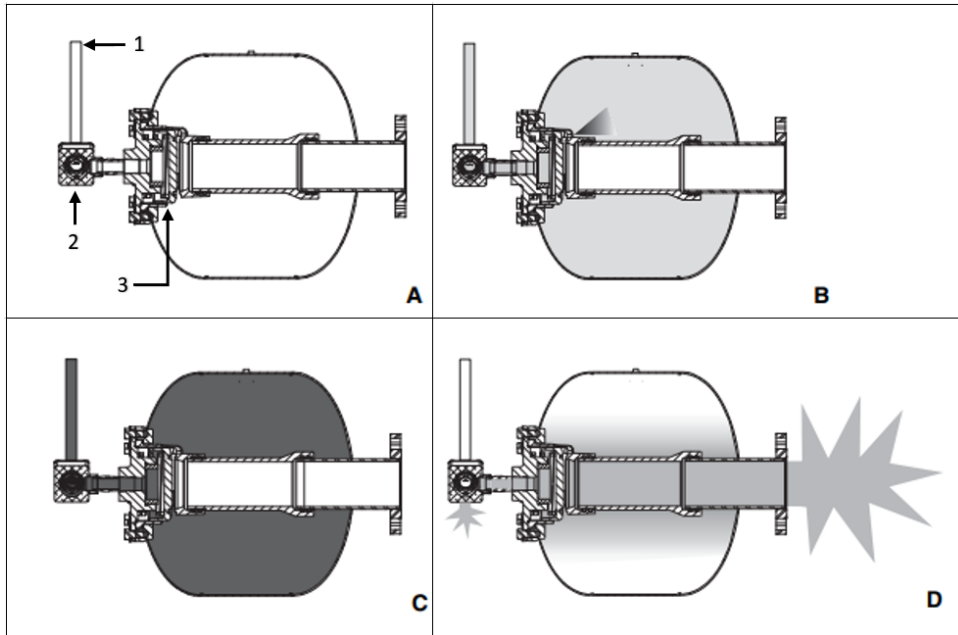


Fig. 1: Functional principle of air cannon

Item	Description
1	Compressed air feed
2	Quick exhaust valve (QEV)
3	Piston

The air cannon is filled with compressed air (A, Fig. 1) via the quick exhaust valve (2, Fig. 1) this is controlled by a solenoid valve. This valve is open when it has no electrical power. The air that flows in via the QEV gets into the pressure vessel (B, Fig. 1) via a piston. As soon as there is no pressure difference between pipe and pressure vessel, the filling operation is completed (C, Fig.1). The air flow stops and the air cannon is "ready to fire".

If the solenoid valve is activated, the inlet air flow is interrupted (1, Fig. 1) and the air between QEV and solenoid valve is bled off. This causes the holding pressure of the piston (3, Fig. 1) to drop across the QEV. The heavily compressed air escapes abruptly through the connecting pipe into the bulk material hopper (D, Fig. 1).

3.3

Design of the pressure vessel

**WARNING! DANGER OF EXPLOSION**

Flying sparks or mechanical stresses can cause the pressure vessel to explode.

Never weld the pressure vessel and never expose it to mechanical loads (due to modifications) such as clamping or mechanical stresses.

Bleed the air cannons before every type of installation and maintenance work.

Any technical change to the pressure vessel or to any pressurised parts invalidates the CE label and operation and usage in terms of the EU Machinery Directive (2006/42/EC) is no longer permitted.

The pressure vessel is manufactured in accordance with EU Directive 2014/68/EU. The inner surfaces of the pressure vessel are painted in the factory to protect them against corrosion.

3.4

Manufacturer and model numbers

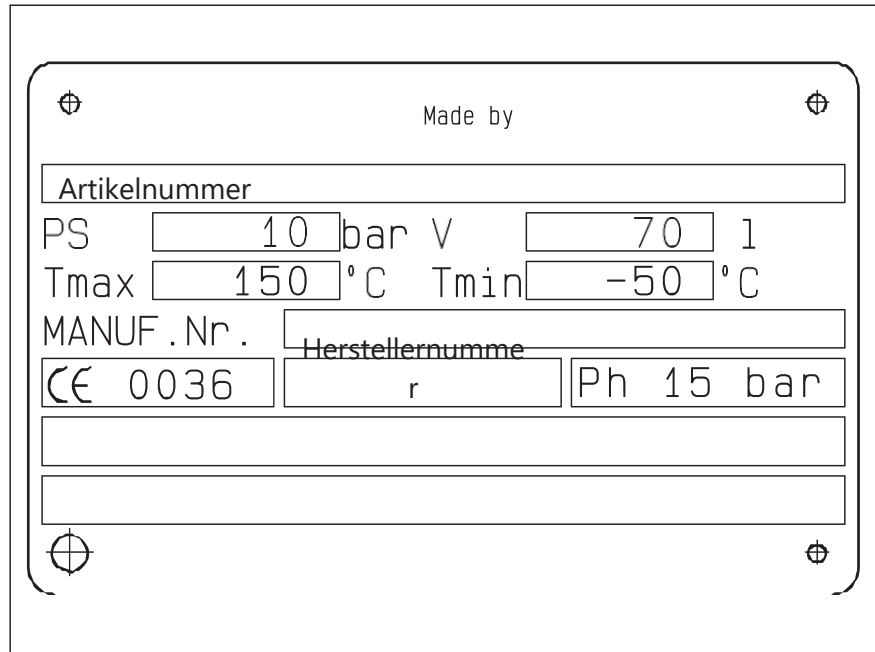


Fig. 2:

The manufacturer and model numbers are given on the nameplate attached to the air cannon. These numbers are to be quoted in any order sent to Martin Engineering or an authorised dealer for spare parts as well as in any correspondence.

3.5

Required Accessories

Various accessories are required for the full operational capacity of the air cannon. These include, for example, solenoid valves, filters, controllers, pressure gauges, ball valves, hoses, flange brackets and nozzles and can be purchased from Martin Engineering. Refer also to Section 9 "Part numbers" in these installation instructions.

The use of various accessories may be necessary depending on the usage conditions. Please contact Martin Engineering or one of its authorised contracted dealers for this.

3.6

Air Cannon service life

Depending on the external conditions and the process parameters, a service life of up to 10 years is possible for the complete air cannon if all local and/or international pressure vessel regulations and the required maintenance and inspection intervals for the air cannon pressure vessel, the valves and all accessories are complied with.

4 Preparing for the installation

4.1 Before the installation

4.1.1 Required materials and tools

Any special tools required in addition to the standard tools for the installation and maintenance of the air cannon are indicated at the corresponding locations.

4.1.2 Preparatory measures



NOTE

Perform the inspections carefully and completely as described. The shipping company is liable for any transport damage! Please contact the shipper with any damage claims.



NOTE

An unfavourably or improperly installed product can disrupt the conveyor process or contaminate the bulk material to be transported. The owner-operator is responsible for taking the required countermeasures.

In the case of applications with contaminants, please seek the advice of Martin Engineering or one of its representatives.

1. Inspect the delivery for the following conditions:
 - Is the delivery complete? Does the number of pallets/ crates/containers delivered match the number on the delivery note?
 - Do all of the transport packages appear to be undamaged? Does damage to the packaging exist which indicates damage to the product contained inside?
2. Always record any incompleteness or transport damage discovered in the delivery and have it confirmed by the shipper. All damaged products must be kept for inspection.

3. The delivery should include the following parts, depending on the scope of the order:
 - MARTIN® Typhoon Air Cannon
 - Quick exhaust valve
 - Installation and operating materials depending on the scope of the order.
 - Warning labels:
 - Part no. 34070
 - Part no. 31913
 - Part no. 33439
 - Part no. 35146
 - Installation instructions.
4. Report any missing or damaged parts to Martin Engineering or one of its authorised dealers.
5. Ensure that sufficiently high pressure relief is provided if compressed air is discharged into closed systems. This can prevent the internal pressure from reaching values which can damage the system. The individual design parameters of the system must also be noted. The transient increase of the air pressure in the system after the air cannon is discharged can be calculated by the following equation:

$$p = \frac{\text{Air cannon pressure} \times \text{Air cannon volume}}{\text{Aircannonvolume} + \text{free volume in vessel}}$$

6. If the calculated compressed air exceeds the system-specific overpressure, then one or more pressure relief devices must be installed to protect the system. Comply with all of the applicable laws and standards in this process.

5 Installation

5.1 Safety information



NOTE

Read this section completely before starting any kind of work!



WARNING! DANGER OF EXPLOSION!

Increased risk when using a cutting torch or welding device in closed spaces!

Check the gas and dust content of the air before usage.



WARNING! DANGER OF EXPLOSION!

The pressure vessel can burst if the permissible operating pressure is exceeded.

*Refer to the safety valve documentation for further information.
Never use a safety valve having a higher pressure limit than the permissible operating pressure of the pressure vessel.*



DANGER! MATERIAL FLYING ABOUT

Firing the air cannon can cause material to be slung around which can lead to fatal injuries.

*Do not open any access ports to the container and to not enter it for as long as the air cannons are filled and operating.
Clear out the safety zone before firing if the air cannons are installed in an open container.*

5.2

Installation process

The air cannon can only be installed and/or operated in connection with a nozzle and flange bracket. The installation of the two products takes place one after the other.



NOTE

Read this section completely before starting any kind of work!

Parts of this installation are described in these installation instructions.

The remaining steps are described in the installation instructions for the nozzles and flange plates. All of the installation steps are listed in the following table. Each step indicates where the corresponding information can be found:

No.	Installation step	Instructions
1	Installing the flange plate	M3773
2	Installing the nozzles	M3773
3	Installing the air cannon	M3813
4	Connecting the air cannon to the compressed air supply	M3813

Tab. 1: Installation steps

5.2.1

Installing the flange plate

Follow the instructions for this in the installation instructions for the flange plates and nozzles.

5.2.2

Installing the nozzles

Follow the instructions for this in the installation instructions for the flange plates and nozzles.

5.2.3

Connect the air cannon to the discharge pipe of the nozzle

1. Fit the separate flange onto the discharge pipe of the nozzle.
 - Screw the flange completely onto the discharge pipe if the pipe is threaded. Once the air cannon has been aligned, secure the connection by spot welding – if required.

**NOTE**

Threaded connections may not be completely welded.

- With smooth discharge pipes, slide the flange onto the pipe and weld a continuous fillet seam.
2. Lay a flat gasket on the previously installed flange, mount the air cannon with the flange side and screw in place.

5.2.4

Installing the securing cable**DANGER! FALLING LOADS**

The air cannon can fall down and cause serious or fatal injuries. *Secure the air cannon using the wire cable supplied.*

**NOTE**

Do not connect the air cannon rigidly (e.g. strapping) to the unit to be cleaned. Otherwise the pressure vessel cannot work and the air cannon can fail.

1. Fix the securing ring supplied (A, Fig. 3) to the vessel wall (B, Fig. 3) with a 6 mm fillet weld.

**NOTE**

Use suitable fastening material for bulk material containers having properties other than those of steel.

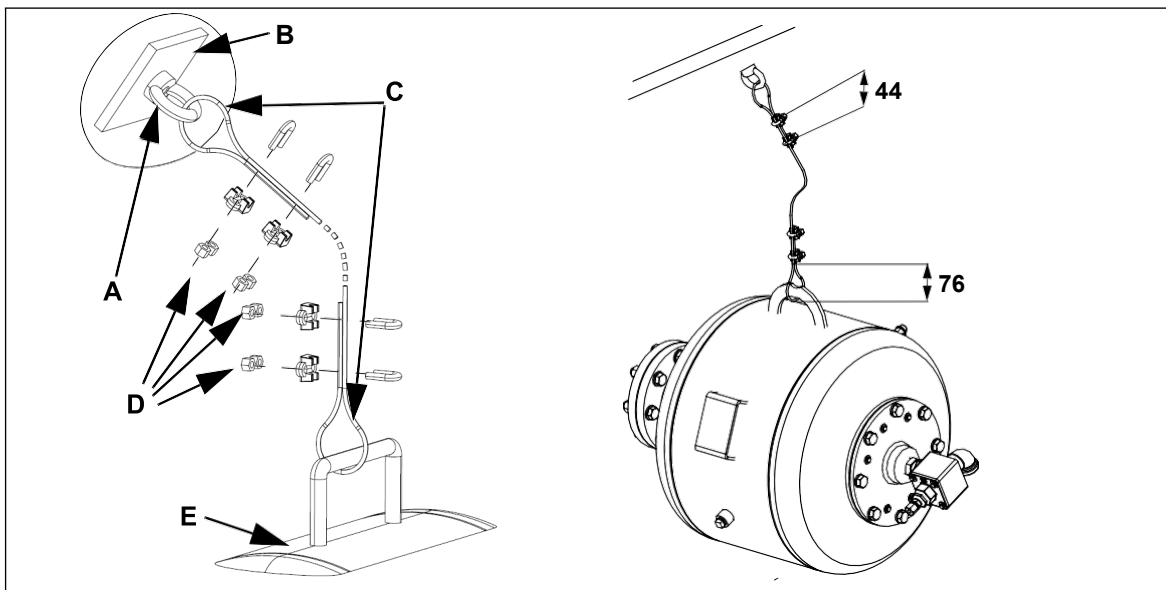


Fig. 3:

Item	Description
A	Securing ring (2)
B	Container wall
C	Safety cable
D	Cable clamps (4)
E	Pressure vessel

2. Lead the securing cable (C) through the securing ring and make a loop with 76 mm diameter.
3. Install a cable clamp (D) as closely to the loop as possible and an additional cable clamp at a distance of around 44 mm.
4. Leave an end free with a length of at least 25 mm.
5. Tighten the bolts alternately and evenly with a torque of 20 Nm.



NOTE

Install the securing cable with a sag of 50 to 75 mm. Secure the ends of any shortened cables against protruding wires (risk of injury).

6. Repeat steps 2-5 on the air cannon tank.

5.2.5

Installing quick exhaust valve (SEV).

**NOTE**

The SEV is available from Martin Engineering as an option and must always meet the Technical Specifications of the air cannon.

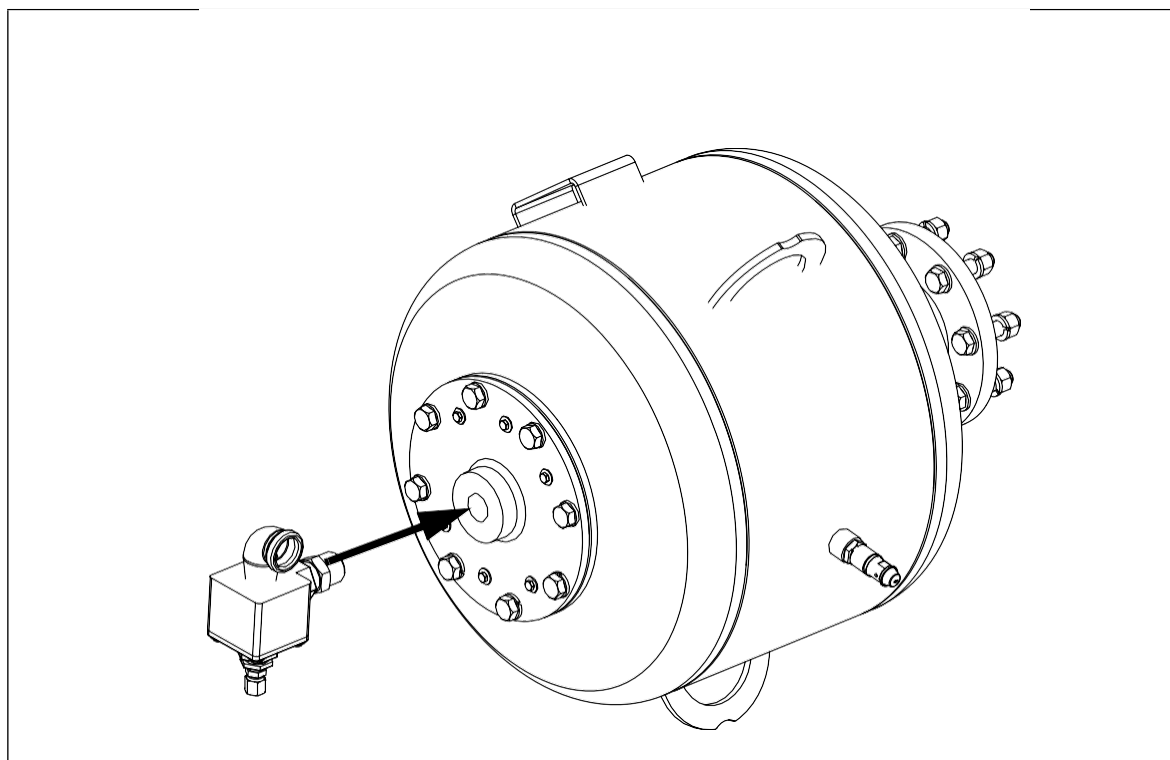


Fig. 4:

1. The threads of the SEV and air cannon can be provided with a suitable sealant.
2. Screw the SEV onto the air cannon.

5.2.6

Air cannon connection

**NOTE**

If the pressure in the bulk material container exceeds 0.3 bar, material can penetrate into the air cannon and so foul valves or pressure vessel.

For higher process pressures, please get in touch with Martin Engineering or an authorised dealer.

**NOTE**

Use suitable sealant for all fittings.

With leaks, adequate pressure cannot be built up in the air cannon.

**NOTE**

Observe the applicable regulations with respect to safety valves and gauges.

1. Use suitable sealants for all connection points.
2. Remove the ½" BSP dust protection cap from the inspection connector (one or more) of the pressure vessel.
3. Attach the safety valve to the pressure vessel. Observe the safety valve documentation in this respect.
4. Check whether all connections are securely tightened and have no leaks.

**CAUTION! RISK OF INJURY!**

Contamination of the valve can cause the air cannon to malfunction. Blow-off air can cause personal injury.
Align the pipe elbow on the valve vent opening downwards if possible.
The vent opening must not be closed and its diameter not reduced.

**NOTE**

Martin Engineering also supplies manually controlled valves, explosion-proof valves, and complete solenoid valve cabinets. If you have any questions, please contact Martin Engineering or an authorised dealership.

5.2.7 Solenoid valve cabinet

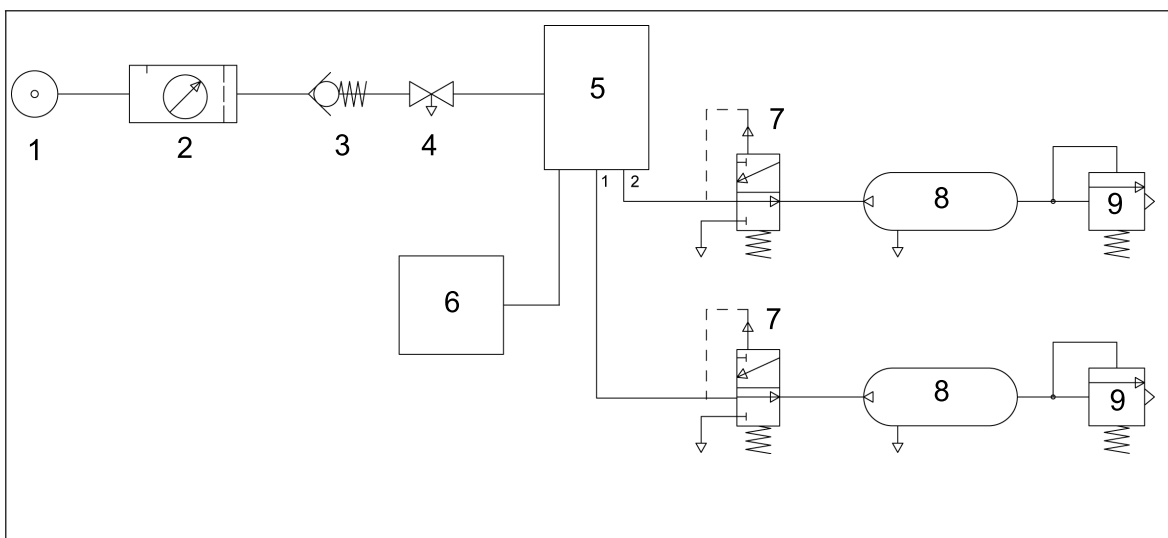


Fig. 5: Pneumatic plan for solenoid valve cabinet

Item	Description
1	Compressed air supply
2	Maintenance unit
3	Check valve
4	Shut-off valve with relief
5	Solenoid valve cabinet
6	Control system
7	Quick exhaust valve (SEV)
8	Air cannon
9	Safety valve



NOTE

Only use solenoid valve cabinets specially fabricated by Martin Engineering for air cannons. Other cabinets may not have the function and performance required.

**NOTE**

The solenoid valve cabinets used by Martin Engineering as standard have protection class IP66. They are not authorised for explosion-endangered areas. If an Ex-proof solenoid valve cabinet is required, get in touch with Martin Engineering or your dealer.

1. Determine the installation site of the solenoid valve cabinet.
2. Install the cabinet with the screw connections pointing downwards.
3. Connect the control cables to the solenoid valve cabinet:
 - Press the filling and control lines into the appropriate threaded connections on the MVS.
 - Lay the filling and control lines to the SEV of the air cannon.

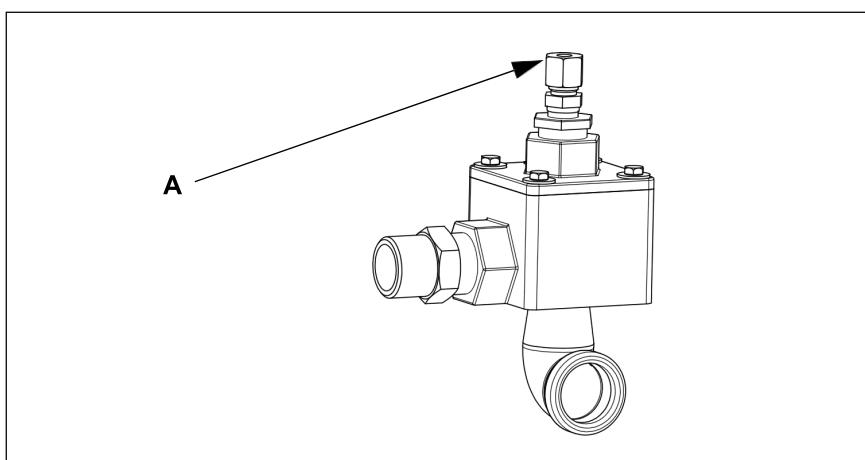


Fig. 6:

- Screw the control line into the control port (A, Fig. 6) of the exhaust valve.

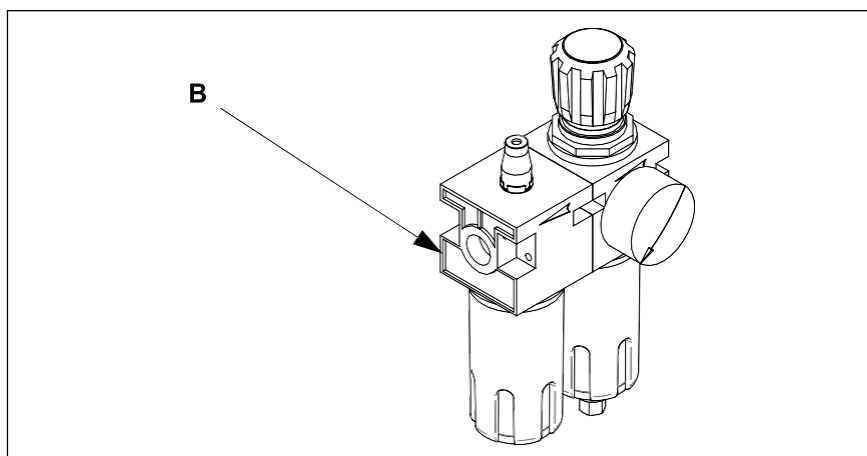


Fig. 7:

4. Connect the 1/2" maintenance unit (B, Fig. 7) at the input to the solenoid valve cabinet.



NOTE

Note the direction of flow arrows on the maintenance unit, the check valve and the ball valve when performing the installation.

5. (Optional) Fill the mist oiler with suitable pneumatic oil (refer to the documentation from the manufacturer of the oiler).
6. Set the oiler in such a way that lubrication of the parts is noticeable.
7. Seal the connections using a suitable sealant.
8. Lay all pipes securely and protected against external influences.

5.2.8

Electrical installation of the solenoid valve cabinet

The electrical installation may only be performed by an electrician. Comply with all laws, standards and directives which are applicable for the company. Earth the electrical equipment in accordance with the applicable regulations.



NOTE

VDE-certified control systems and the required accessories (e.g. switches, timers, cables) for the installation of the solenoid valve cabinet are available from Martin Engineering.

Observe the installation instructions enclosed with the solenoid valve cabinet and/or control system.

5.3

Trial operation

5.3.1

Checking the installation of the MARTIN® air cannon



NOTE

Read through this section completely before starting any work on the air cannon or on the compressed air supply system of the customer.

1. If multiple vessel openings or connections exist, appropriate warning labels must be attached to all of them. Additional warning labels can be ordered from Martin Engineering or a contracted dealer.
2. Vent all of the compressed air lines.



NOTE

Bleed (vent) the individual air cannons to avoid a large pressure drop in the pressure system. The default setting (ex-works) for opening safety valve is 10 bar. Martin Engineering provides safety valves for pressures up to 10 bar. Check the permissible operating pressure on the nameplate of the pressure vessel before using a safety valve. Never use a safety valve having a higher pressure limit than the permissible operating pressure of the pressure vessel.
(observe the safety valve technical documentation).



NOTE

Although the recommended minimum pressure for most applications is 5 bars, a lower operating pressure is possible. Ensure that the air cannon is supplied solely with filtered and controllable compressed air (see Section 10.1 "Compressed air specifications")

**WARNING! DANGER OF EXPLOSION!**

The pressure vessel can burst if the permissible operating pressure is exceeded.

The safety valve opens at a pressure between 90% and 100% of the set pressure. Never use a safety valve having a higher pressure limit than the permissible operating pressure of the pressure vessel.

3. Commission the compressed air supply to the air cannon.
4. If the air cannon does not fill on first commissioning, look at Section 7 "Troubleshooting".
5. Check the air cannon installation for leaks. Note Section 7 "Troubleshooting" if leaks occur.

**NOTE**

A small amount of air escapes from the solenoid valve and the venting valve during initial commissioning and every subsequent restart.

**DANGER! MATERIAL FLYING ABOUT**

Firing the air cannon can cause material to be slung around which can lead to fatal injuries.

Do not open any access ports to the bulk material container and do not enter it as long as the air cannons are filled and in operation. Clear out the safety zone before firing if the air cannons are installed in an open bulk container.

**NOTE**

Since a loud bang is produced when the air cannon is fired, wear hearing protection.

6. Firing the air cannon: of air cannons with solenoid valve and external control system by a signal from the control system (by button, timer, etc.) or by manual actuation of the solenoid valve. A signal is sent to the electro-solenoid valve when the installation is correct and the selected air cannon is fired.
7. Test each air cannon by firing it five times. After each discharge, wait till the pressure vessel has been completely filled.
8. The air cannon can be started up if correctly functioning. Refer to Section 7 "Troubleshooting" if problems occur.

**NOTE**

Make certain that the air cannon is always filled with compressed air. This makes it ready to operate at all times and no process material can penetrate it.

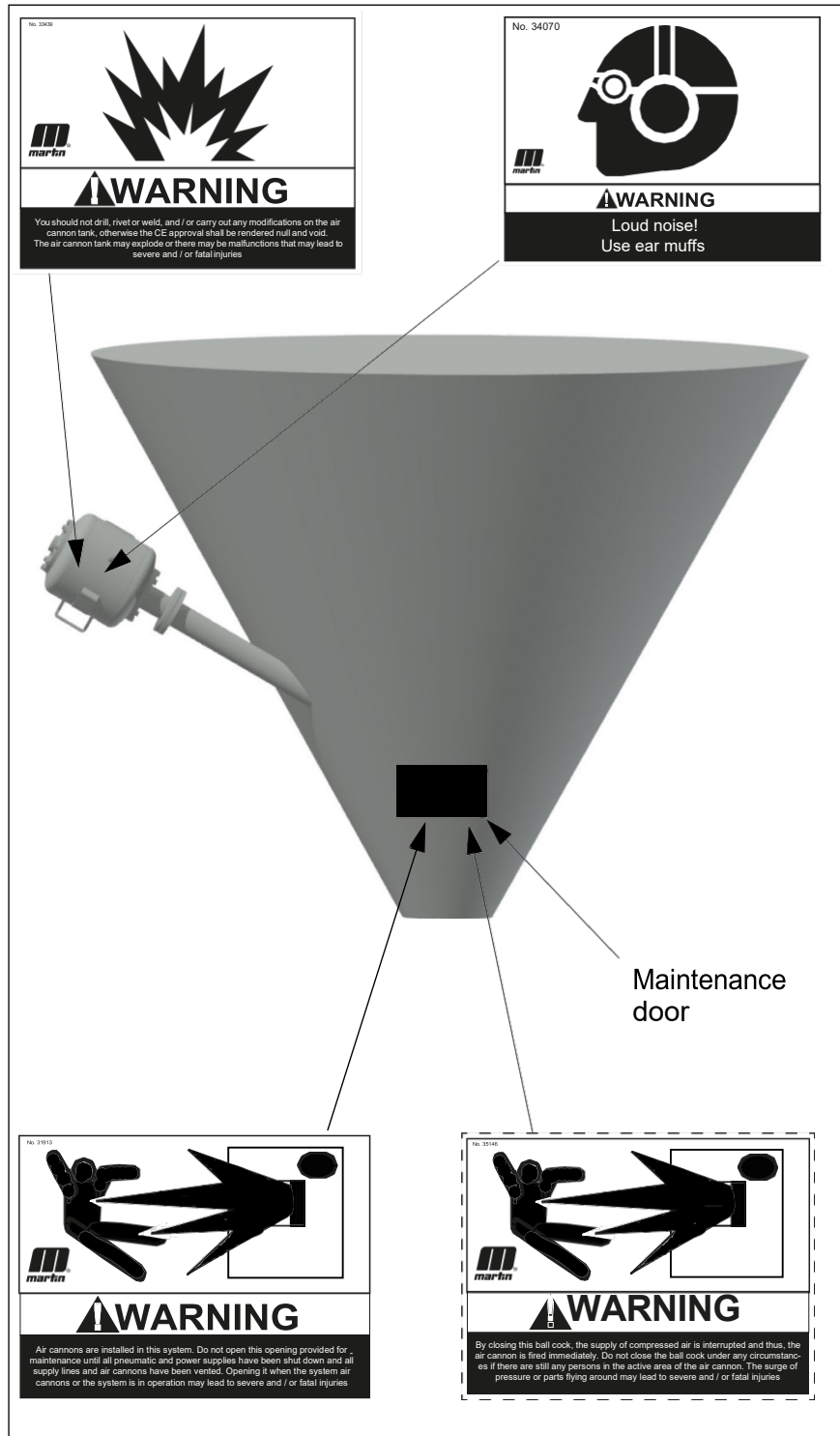


Fig. 8: Warning label for MARTIN® Typhoon air cannon

6 Maintenance

6.1 Safety information



NOTE

Maintenance inspections must be performed at least once a month. Shorter maintenance intervals may be required depending on the operating conditions.



NOTE

Read this section completely before starting any kind of work.



CAUTION! RISK OF INJURY!

Compressed air hoses slinging about can cause injuries and property damage.

The compressed air network on the operator side must be depressurised and secured against accidental reactivation before maintenance work can be started.

Post warning signs.



CAUTION! DANGER OF EXPLOSION!

Welding work on the pressure vessel can lead to an explosion caused by flying sparks.

Never weld damaged or leaking pressure vessels.

Defective parts must be replaced or repaired by Martin Engineering.

The air cannon may not be brought into operation if the pressure vessel is damaged or leaking.

Observe relevant standards and regulations.



WARNING! RISK OF INJURY!

The energy supply must be shut off and secured against accidental reactivation before any work is performed on the air cannon system. Observe the applicable regulations and standards.

Post appropriate warning signs.

Shut off the air cannon system.

6.2

Routine maintenance inspections

1. Inspect all connections in the air cannon system for leaks and wear. Leaking joints must be sealed and screw connections must be tightened. Damaged or worn fittings must be replaced.
2. Ensure that the bend radius of the hoses is greater than 60 mm and that all pipes and cables are securely laid. Rectify damage, fix loose lines in place.
3. Check the functioning of the valve, the solenoid valve, the shut-off ball valve and the maintenance unit. Replace defective parts immediately.
4. Check functioning of the pressure gauge. Clean the glass and check the scale for legibility.
5. Check the safety valve: Observe the safety valve documentation in this respect.
6. Check the securing wire cable. Make sure that the cable clamps are fixed and that the components are not damaged or corroded.
7. Clean all warning labels. Replace all warning labels that are no longer legible. Additional warning labels can be ordered from Martin Engineering or authorised dealer.

6.3

Annual maintenance or after 50,000 firings

1. Fire the air cannon to allow the air to escape from the pressure vessel.
2. Pull on the ring of the safety valve to check that the air cannon is depressurised. Observe the safety valve documentation in this respect.
3. Carry out all regular maintenance work (see Sect. 6.2).
4. Remove the drain screw; allow any fluid contained there to run off completely.
5. Seal the drain screw using a suitable sealant. Screw the drain screw back into the pressure vessel.

**CAUTION! DANGER OF EXPLOSION!**

Welding work on the pressure vessel can lead to an explosion caused by flying sparks.

Never weld damaged or leaking pressure vessels.

Defective parts must be replaced or repaired by Martin Engineering.

The air cannon may not be brought into operation if the pressure vessel is damaged or leaking.

Observe relevant standards and regulations.

6. Check air cannon for corrosion, loose screws and bolts as well as defective weld seams. Tighten loose screws and repair all damaged parts.
7. Check pressure vessel, valve, piston and nozzle for damage and dirt. Replace defective components or have them repaired by Martin Engineering.
8. Check securing wire cable for wear; replace if there signs of wear and tear.
9. Check the electrical cables and connections on systems with electronic control; replace defective components or repair these in line with all relevant regulations and standards.

6.4

Replacement of worn components

6.4.1

Removal of the quick exhaust valve

1. Close optional safety shield. Make sure when the air cannon's air outlet is open that adequate protection exists against hazards caused by freely moving material and against risks in the discharge area.

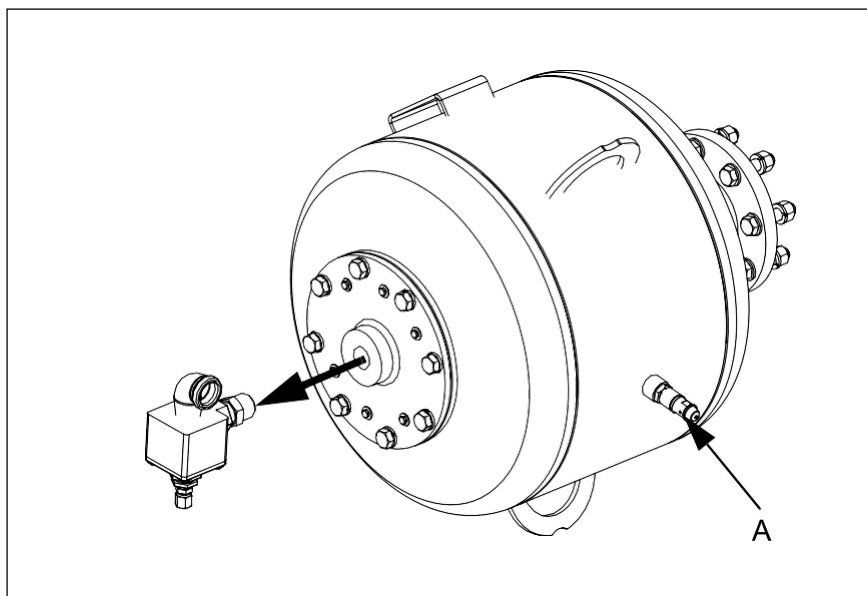


Fig. 9:

2. Activate the safety relief valve (A, Fig. 9) to discharge the air cannon.
3. Detach the compressed air lines and quick exhaust valve from the pressure vessel.
4. Remove all eight screws of the valve.

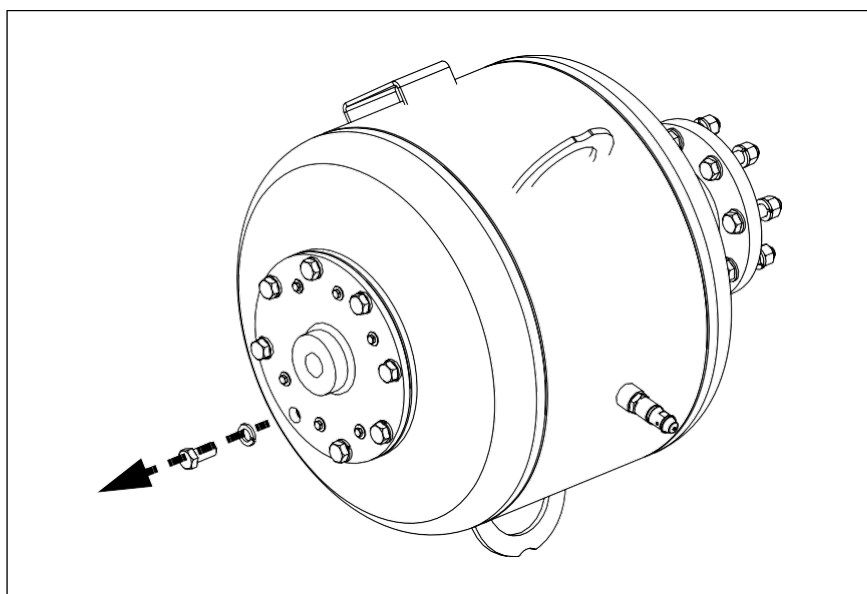


Fig. 10:

5. Remove the valve from the pressure vessel; if the O-rings are dried on, a small crowbar or similar can be useful. Make certain that the sealing surfaces are not damaged during the deinstallation.

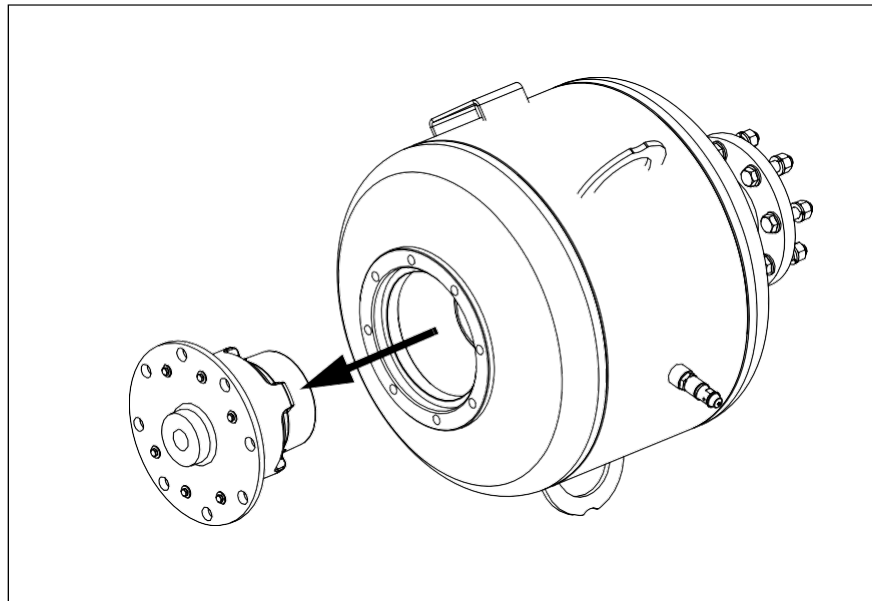


Fig. 11:

6.4.2

Replacing the spring and piston unit valve cover

1. Remove the SEV, see Section "Removal of the quick exhaust valve".

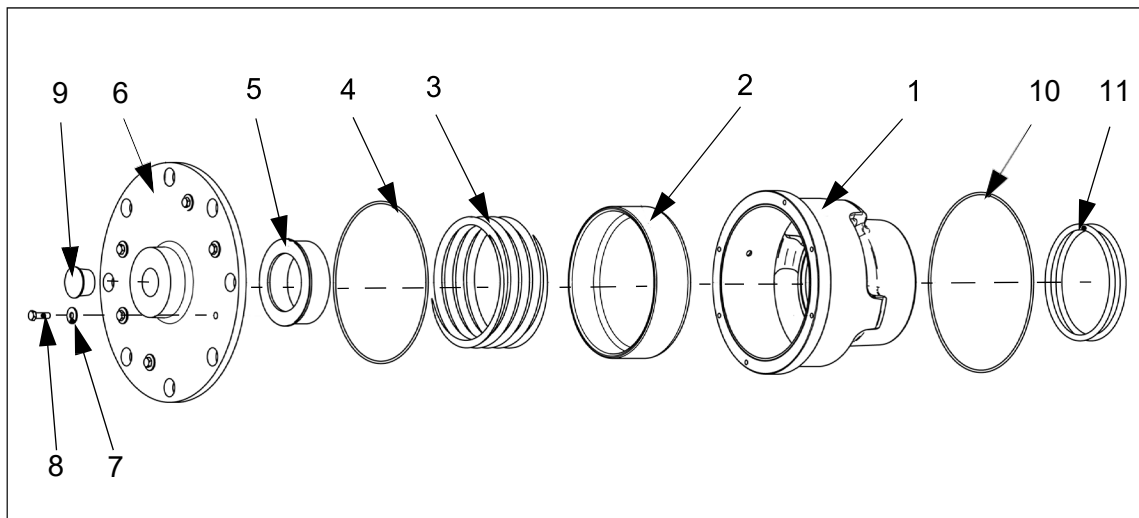


Fig. 12:

Item	Description
1	Basket
2	Piston
3	Compression spring
4	O-ring
5	Piston damping ring
6	Valve cover
7	Spring washer
8	Hex-head screw
9	Plastic plug
10	O-ring
11	Silicone ring

2. Remove compression spring (3, Fig. 14) and piston (2, Fig. 14).

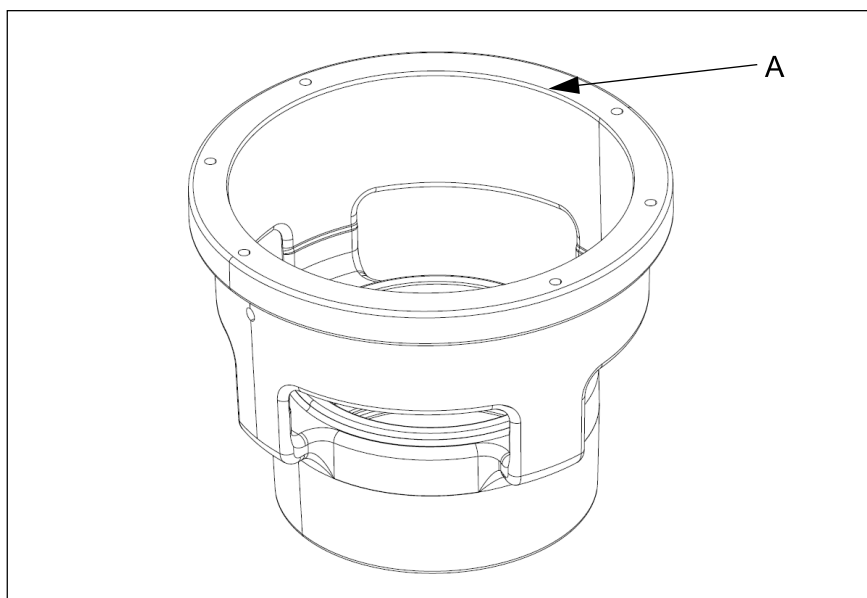


Fig. 13:

3. Check bearing surface (A, Fig. 13) for excessive wear or stress fractures in the aluminium casting.
4. Remove O-rings (4 and 10, Fig. 12) and clean all surfaces.
5. Insert new spring (3, Fig. 12) and piston (2, Fig. 12) in the basket (1, Fig. 12).
6. Insert O-rings (4 and 10, Fig. 12) at the discharge valve and basket.



NOTE

If the O-rings are showing the first signs of wear, these must also be replaced by new O-rings.

7. Install the quick exhaust valve, see Section "Installation of the quick exhaust valve".

6.4.3

Replacing the SEV spring and piston unit

8. Remove the SEV, see Section "Removal of the quick exhaust valve".

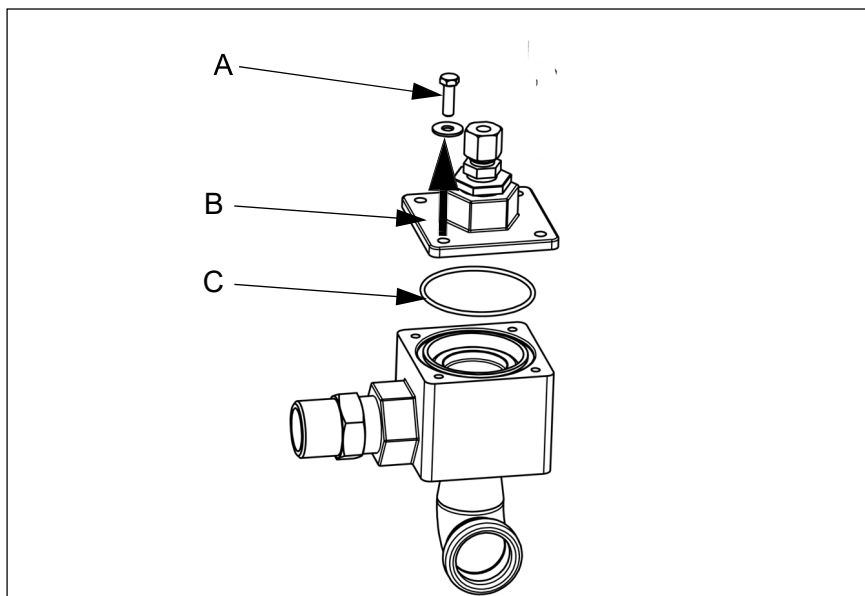


Fig. 14:

1. Loosen hex-head screws (A, Fig. 14).
2. Remove SEV cover (B, Fig. 14).
3. Remove O-rings (C, Fig. 14) and clean all surfaces.
4. Insert new O-ring.
9. Install the quick exhaust valve, see Section "Installation of the quick exhaust valve".

6.4.4

Installation of the exhaust valve

1. Lubricate the O-ring (4, Fig. 26) and the groove adequately with a suitable grease.
2. Fix the O-ring firmly in the groove.

**NOTE**

Ensure that the O-Ring is cleanly inserted into the groove and does not fall out again; otherwise there is a risk of damage.

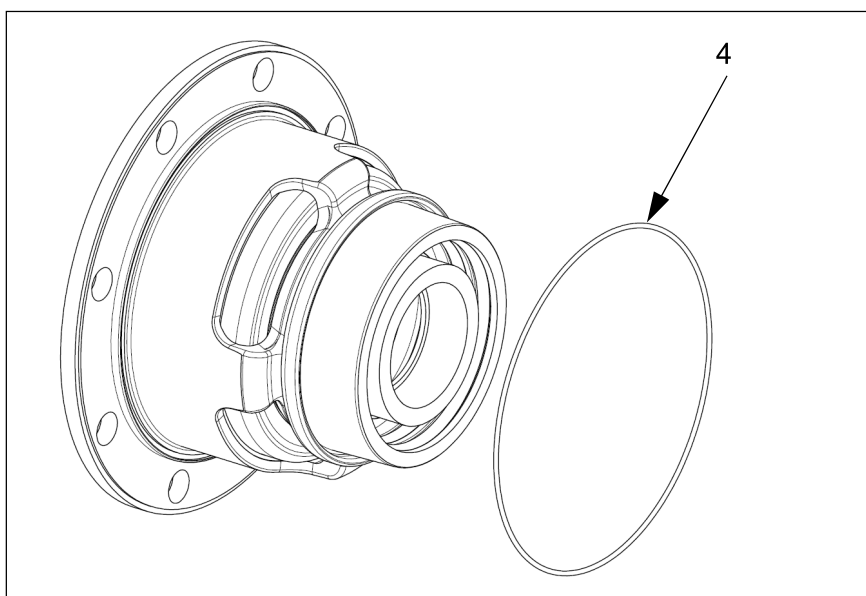


Fig. 15:

3. Lightly grease the O-ring and groove in the discharge pipe.

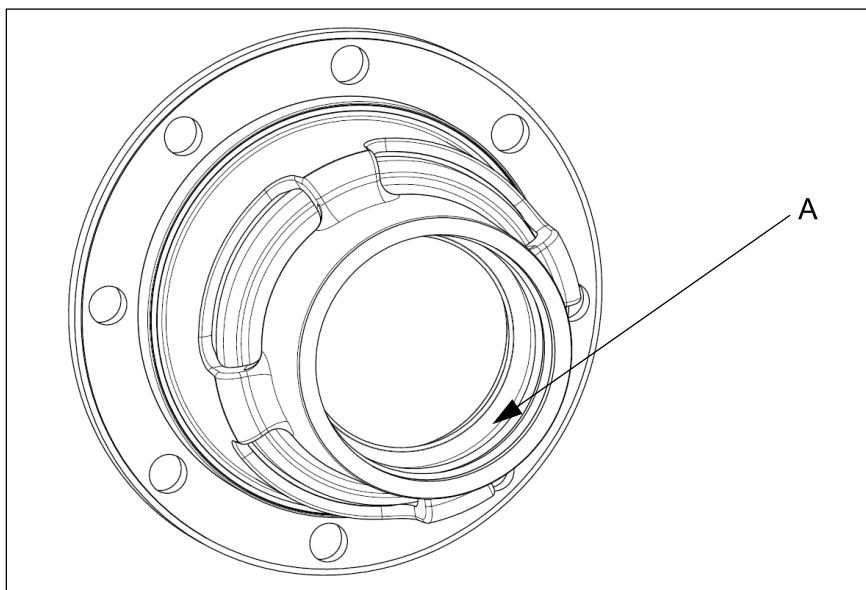


Fig. 16:

4. Inspect the inside of the air cannon (B, Fig. 17); ensure that the surfaces of the discharge pipe are smooth and clean so that the O-rings lie correctly and a hermetic seal is obtained.

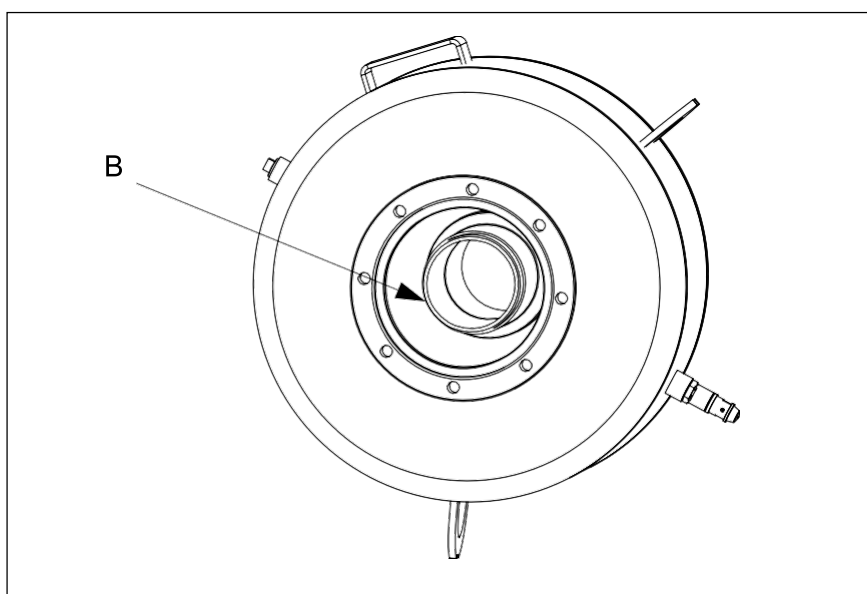


Fig. 17:

5. Place the valve on the discharge pipe; make sure that the O-ring (4, Fig. 15) is not pinched.

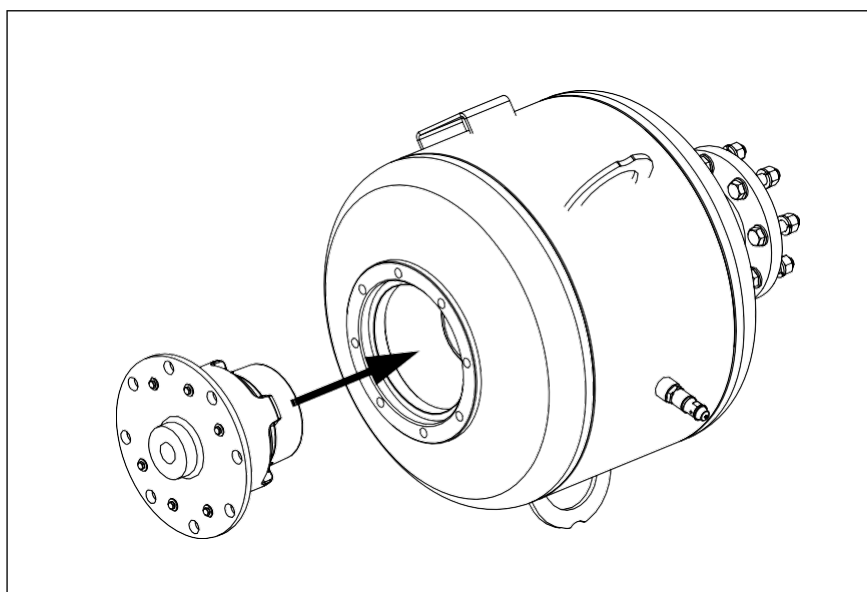


Fig. 18:



NOTE

Ensure that the O-Ring is cleanly inserted into the groove and does not fall out again; otherwise there is a risk of damage.

6. Insert and tighten the eight screws with washers. See Tab. 5 on page 51 for tightening torques.

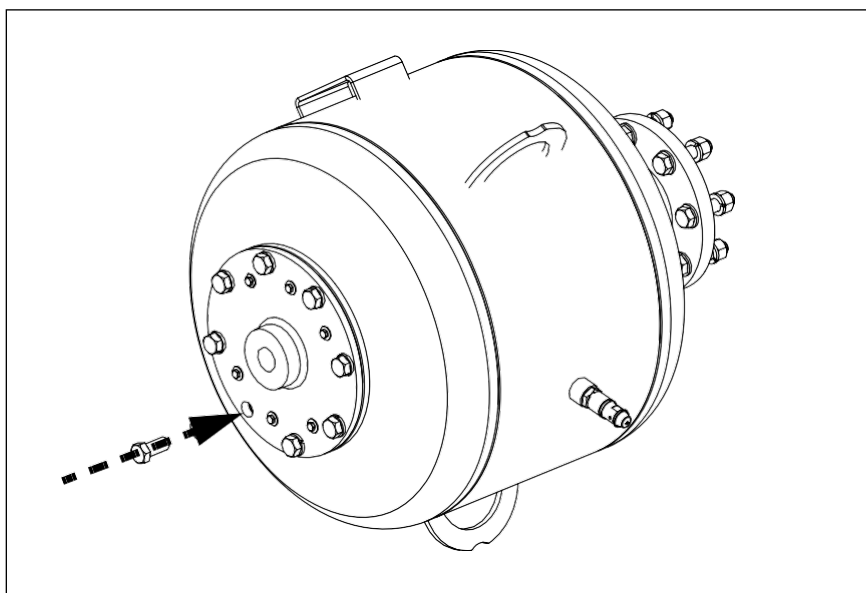


Fig. 19:

7. Connect the compressed air supply line; make sure that it sits firmly and is leak-tight:

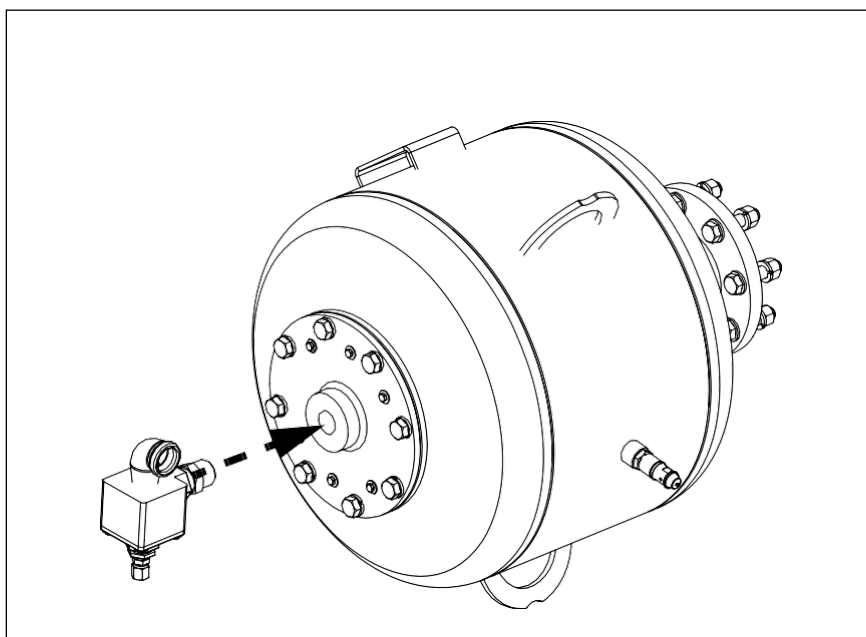


Fig. 20:

8. Set the optional safety shield to the "open" position:

9. Slowly apply pressure to the air cannon; please note whether seals deform and/or leaks develop.
10. Wait till the air cannon is full and then test fire it using the valve control.
11. The air cannon is again ready for operation if the firing process functions flawlessly.

**NOTE**

Observe the pressure gauge when carrying out the firing; the needle should fall back immediately to the "zero" position. The discharge openings should be directed downwards so that no dirt can get into the valve.

7 Troubleshooting

7.1 Safety information



NOTE

The air cannon can be used in many different processes. Malfunctions can therefore occur in addition to those listed below. In this case, either Martin Engineering or one of its representatives can assist with the positioning or with special solutions.

7.2 Troubleshooting

Check the condition of all air cannon valves and solenoid valves before performing other repair work. Damaged valves which can no longer be moved or are stuck in one position cause symptoms which can correspond to the conditions listed below. Check the electrical and pneumatic connections to all valves. To quickly localise the possible cause of the fault, Martin Engineering recommends beginning the search at the air cannon.. In the course of this, a manual functional test of the air cannon should be carried out using the hand lever and then the manual override operation at the solenoid valve.

The possible causes and remedies for problems which may occur are described in the following tables. If any of the recommended remedies does not solve your problem, please contact your Martin Engineering dealership.

Symptom	Cause	Remedy
The air cannon does not fill.	No compressed air supply.	Ensure that the compressor is switched on and the compressed air supply pressurised.
	Ball valves closed.	Check whether the ball valves are completely opened on all of the air cannons.
	Maintenance unit incorrectly installed, filter dirty and/or improperly adjusted.	The default setting (ex-works) of the secondary pressure is 0 bar. By lifting and then rotating in the clockwise direction, the desired value can be set and/or the filter cleaned. Check the direction of flow of the maintenance unit – see marking.
	Vessel plug is missing.	Check whether all connections to pressure vessel have been closed.
	Quick exhaust valve (SEV) wrongly installed.	Check whether the filling and control lines have been correctly fitted to the connections.
	SEV dirty, incorrectly assembled or is damaged	Clean or replace SEV or piston.
	Filling and control lines are kinked, blocked or leaking.	Repair filling and control lines.
	5/2-way solenoid valves have incorrect pneumatic connections,	Check connections - refer also to Section 5.2.6. Port 1 = inlet, Port 2 = filling and control lines (open when no power), Port 5 = exhaust.
	3/2-way solenoid valve used is closed when power off.	Use solenoid valve that is open when power off.
	Material in the pressure vessel.	Clean pressure vessel.
	Pressure vessel has a leak.	Replace pressure vessel. (operation not possible till replaced)
	Pressure vessel seal has a leak.	Replace pressure vessel seal.
	Compressed air supply pipe is blocked.	Remove blockage and check filter.

Tab. 2: Troubleshooting

Symptom	Cause	Remedy
Air cannon is always under pressure, but air cannon does not fire.	No pressure in pressure vessel, pressure gauge faulty.	Check functioning of pressure gauge, replace if necessary.
Pressure gauge on pressure vessel does not indicate a pressure, air cannon can however be fired.	No pressure in pressure vessel, pressure gauge faulty.	Check functioning of pressure gauge, replace if necessary.
Air cannon fires neither via electrical signal, nor via manual override of the solenoid valve.	Filling and control lines leaking, kinked or blocked.	Inspect the control line for leaking connections, too small bend radiuses or dirt. Replace if necessary.
	Filling and control lines not properly connected.	Check whether the filling and control lines are connected to the appropriate solenoid valve and to the air cannon.
	Filling and control lines are too long or have the wrong diameters.	Make sure that the filling and control lines with 8/6 mm diameter are not longer than 10 metres.
Air cannon cannot be fired electrically.	Duration of electrical control signal too short.	Make sure, for correct functioning, that the solenoid valve remains activated for 2 seconds.
	Manual override of the solenoid valve locked.	Unlock manual override – see MV (solenoid valve) documentation.
	Solenoid valve defective.	Check the functioning with the manual override of the valve; replace solenoid valve if necessary.
	Electrical connections of the solenoid valves mistakenly interchanged or faulty.	Make sure that the electrical connections are flawless. Compare supply voltage with voltage at the equipment. Check whether signals are sent.

Tab. 2: Troubleshooting

Symptom	Cause	Remedy
The air cannon does not fire or for too short a time.	Discharge connection of the air cannon is blocked.	Check the 1" screw-in elbow at the quick exhaust valve (SEV). It may not be closed.
	SEV dirty or damaged.	Clean or replace SEV or piston.
	SEV wrongly installed or connected.	Check whether SEV is properly connected to the Typhoon valve. Ensure that the filling and control lines are connected to the input connector of the SEV. (see marking).
	Foreign material in the Typhoon valve.	Remove the Typhoon valve, dismantle and clean it, replace parts if necessary.
Air cannon fires accompanied by a "stuttering" noise and a slowly falling pressure gauge reading.	Discharge duct or nozzle blocked.	Free/clean discharge duct.
	Safety shield is closed.	Open the safety shield.
The air cannon fires slowly or has no effect.	Operating pressure too low.	Set the operating pressure to between 5 and 10 bar.

Tab. 2: Troubleshooting

8 Storage, de-installation, disposal

8.1 Packing and transportation

The products described here are packed and shipped by Martin Engineering.

The products may be transported solely in the Martin Engineering packaging.

The logistics company in charge of the shipment shall be responsible for any damage and/or loss.

8.2 Storage

To ensure optimal function of the product, Martin Engineering recommends storing its components in a dry place at room temperature where they are protected against direct sunlight.

The best storage conditions are at temperatures ranging from +0 °C to +30 °C and 60% relative humidity.

Martin Engineering guarantees that the stored products will remain fully functional for at least 2 years under the storage conditions specified here.

8.3 De-installation

The de-installation is carried out in the reverse order of the installation (see Section 5.2.2).

8.4 Disposal

Assemblies and/or single parts of the Martin Engineering products must be professionally disposed of after usage as follows.

- Complete assemblies must be dismantled, sorted by material type, and separately disposed of.

Comply with all nationally and internationally applicable disposal regulations when disposing of the product.

This section lists the product designations with their associated part numbers for the MARTIN® Typhoon Air Cannon and its accessories. Spare parts for accessories not listed here can be purchased from Martin Engineering or from one of its sales representatives.

Please always indicate the part numbers in every order.

9.1

Explanation of part numbers

MARTIN® Typhoon Air Cannon

38005-aaaFD-bbcde-fghj+E		
a		Tank size in liter
	035:	35
	070:	70
	150:	150
b		Tank pressure range in bars (max.)
	08:	8
	10:	10
c		Tank temperature range in °C
	D:	-30 - +150
	E:	-50 - +150
d		Certification standard
	C:	CE Certification
	G:	TR CU Certification
e		Tank finish
	P:	Powder coated (RAL 2004)
	C:	Special painted C5M (RAL 2004)
f		Piston options
	0:	Dual seal piston
	1:	Full aluminium piston
i		Additional option
	0:	-
h		Additional option
	0:	-
i		Additional testing
	0:	No tests
	1:	50% NDT of welding at the tank

9.2

Accessories

- Martin® Thermal hood for air cannon valve cover: Part no. 41643-XX



NOTE

Martin Engineering can provide an exact offer for components and retrofit kits for the regulation of the compressed air supply on request.



NOTE

A large number of nozzles and installation plates are available for Martin air cannon installations. They are described and specified in more detail in the installation instructions M3773.

9.3

Spare parts

- Safety valve (10 bar) Part no.: 21680-10+E
- Air pressure gauge Part no.: 30437-G+E
- Securing cable kit part no.: 32271+E
- MARTIN® Typhoon valve
Part no.: 38071-FD-E
- MARTIN® Hurricane/Tornado exhaust valve rebuild kit part no.: 38137-4
- 4" piston part no.: 38022
- 5/2-way solenoid valve Part no. 41380-XXXXX

9.4

Warning labels / Warning tags

- Warning labels
Part no. 33439
Part no. 34070
Part no. 31913
Part no. 35146

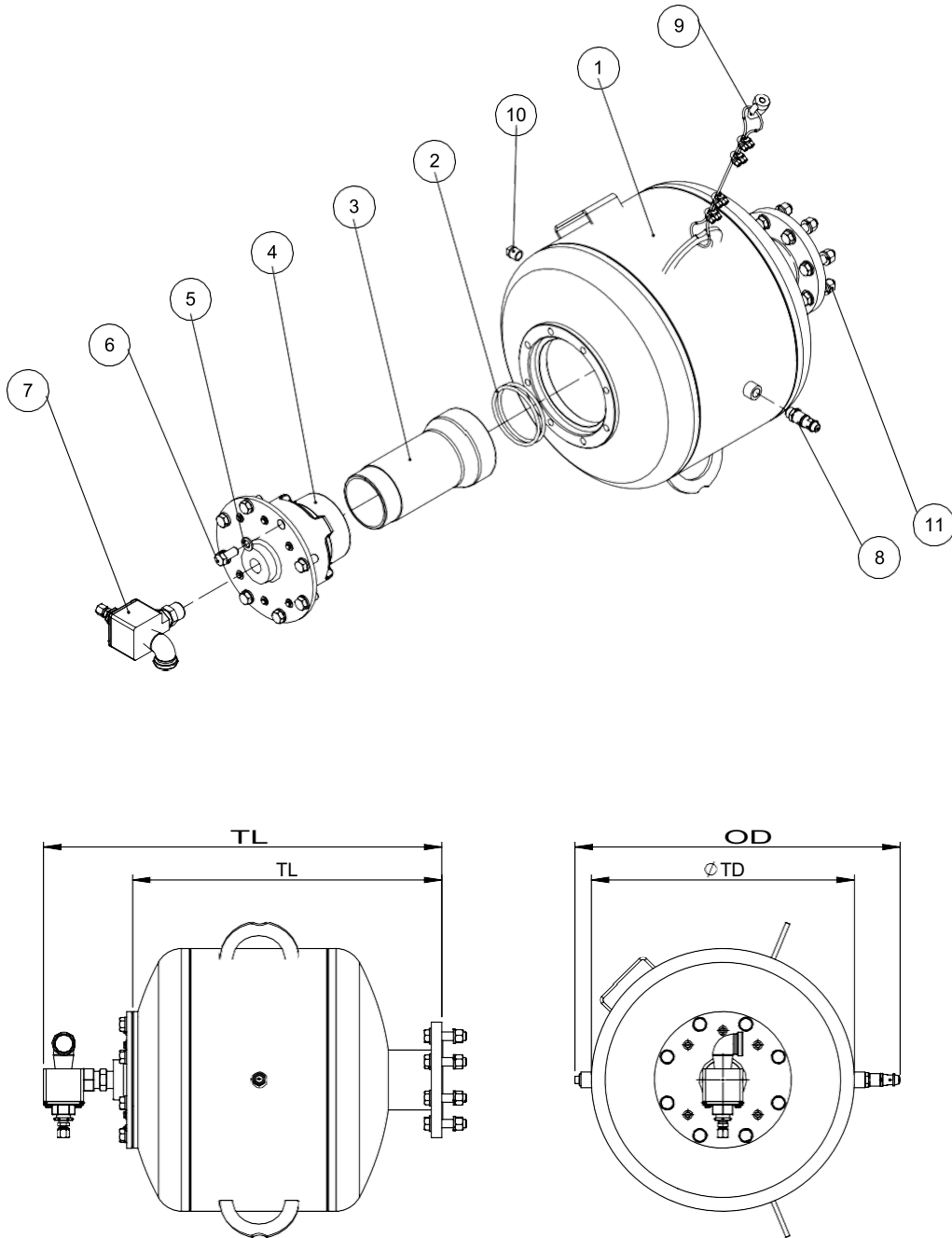


Fig. 21:

Item / Pos.	Qty / Anz.	Description / Beschreibung	P/N / Teile-Nr.
1	1	Air-Cannon-Tank / Luftkanonenbehälter	s.C. / s.T.
2	2	Silicon O-Ring / Silikonring	20771-S
3	1	Inner pipe / Innenrohr	38602
4	1	Typhoon valve ASM / Ventilbaugruppe	38071-FD-E
5	8	Washer spring M16 - DIN 127, (1.0032) galv. / Federring	41090-16AZP
6	8	HHC screw M16 x 35 - DIN 933, (1.0032) galv. / Sechskantschraube	41081-16035BZP88
7	1	Accessory-Kit 1" for 2" and 4" aircannons with 8 mm pipe- or 8 mm hose-installation / Anbausatz	41126-XHV4/2-08
8	1	Safety relief valve G1/2" (10 bar) / Federsicherheitsventil	s.C. / s.T.
9	1	Safety cable kit / Sicherheitskabelsatz	32271+E
10	1	Drain Plug - 1/2" / Gewindestopfen	40044
11	1	Screw set with flat gasket DN 100 / Schraubensatz mit Flachdichtung	41037

Part number / Teilenummer	Part no. item / Teile Nr. Pos.	DIM				Weight / Gewicht
		TD	OD	OL	TL	
		[mm]				[kg]
38005-035FD-XXXXX-XXXX+E	38603-03510-XXX+E	400	518	710	541	51
38005-070FD-XXXXX-XXXX+E	38603-07010-XXX+E	500	618	758	588	62
38005-150FD-XXXXX-XXXX+E	38603-15010-XXX+E	600	718	1000	830	86

Part number / Teilenummer	Part no item / Teile Nr. Pos.
	8
38005-XXXFD-XXDXX-XXX+E	21680-10+E
38005-XXXFD-XXEXX-XXX+E	21680-10E+E

9.6

Parts numbers of the MARTIN® Typhoon exhaust valve cover

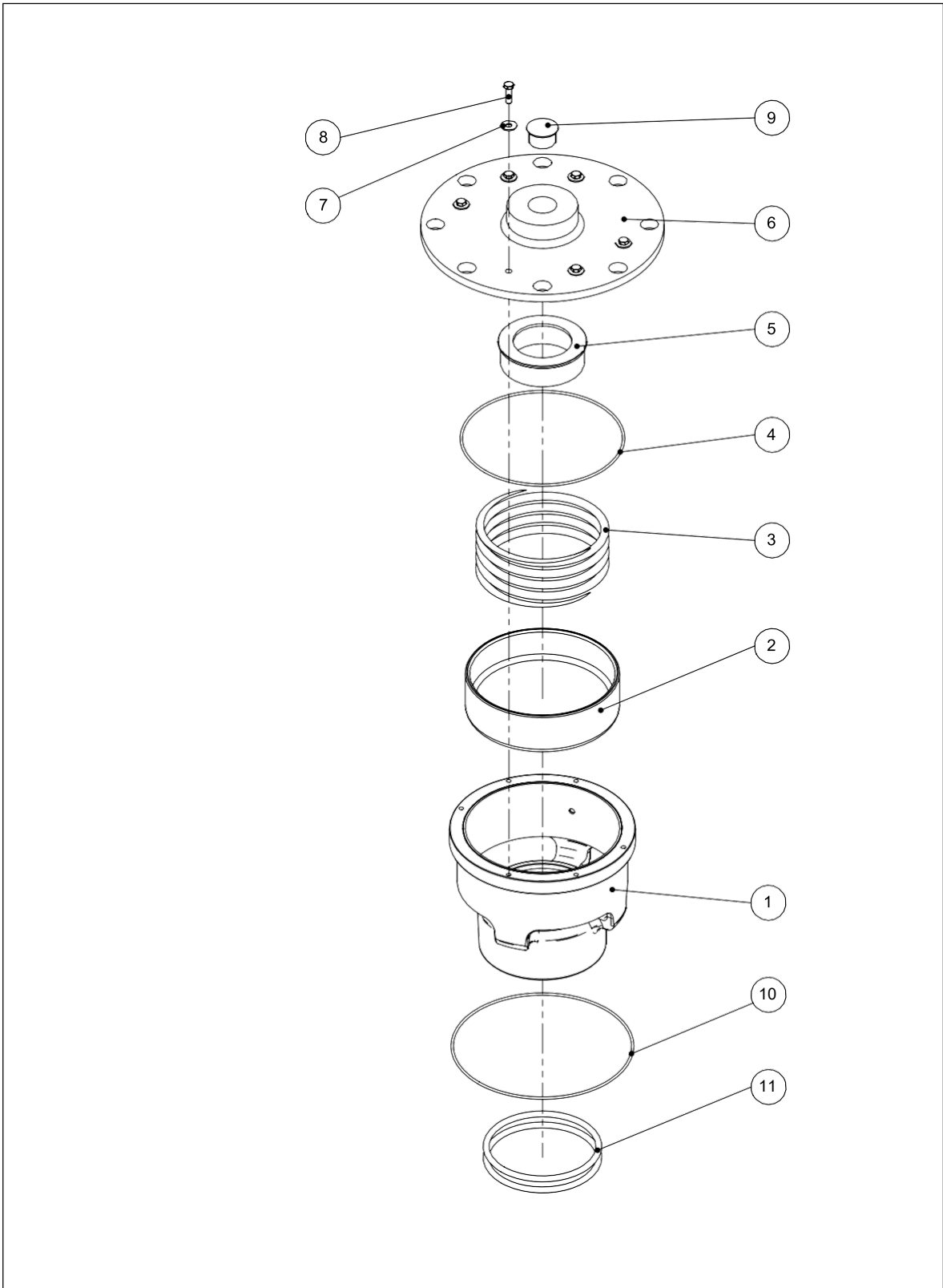


Fig. 22:

Item / Pos.	Qty / Anz	Description / Beschreibung	P/N / Teile-Nr.
1	1	Hurricane basket 4" / Korb	37897-E
2	1	Piston 4" / Kolben	38022
3	1	Compression spring 4" / Druckfeder	35077
4	1	O-Ring 171,1mm ID x 2,6mm CS Viton / O-Ring	35078
5	1	Piston bumper / Kolbendämpfungsring	37793
6	1	XHV 4" valve body cap / Ventildeckel	35073-FD-E
7	6	Washer compression 1/4" / Federscheibe	11521
8	6	HHC Screw M6 x 22 / Sechskantschraube	36530
9	1	Plug plastic 1" / Plastikstopfen	36011
10	1	O-Ring 7-11/16" / O-Ring	38066
11	2	Silicon O-Ring / Silikonring	20771-S

10 Specifications

10.1 Compressed air specifications

The quality of the compressed air used must fulfil class 5 at least of the DIN ISO 8573-1 standard. Otherwise, Martin Engineering cannot guarantee flawless operation of the air cannon.

Class	Max. oil concentration	Max. dust concentration		Max. residual water in air	
		Particle size	Particle density	Residual water	Dew point
	[g/m ³]	[µm]	[mg/m ³]	[g/m ³]	[°C]
1	0.01	0.1	0.1	0.003	-70
2	0.1	1	1	0.117	-40
3	1	5	5	0.88	-20
4	5	15	8	5.953	+3
5	25	40	10	7.732	+7
6	---	---	---	9.356	+10

Tab. 3: Compressed air specifications

10.2 Torque values for the installation

Thread size	Standard initial tensioning force	Tightening torque	Initial tensioning force
	[kN]	[Nm]	[kN]
M6	9	8	12
M12	35	70	40
M16	70	170	80

Tab. 4: Installation tightening torques - Strength class 8.8



**Declaration of Incorporation in accordance with the Machinery Directive (2006/42/EC)
Annex II B for the installation of an incomplete machine**

We, the company Martin Engineering,

In der Rehbach 14

Tel.: +49 (0)6123-97820

D-65396 Walluf

Fax: +49 (0)6123-75533

declare herewith that the product mentioned below

Product designation:

Air Cannon

of the make / type:

Typhoon

with the serial number:

not required

complies with the following provisions:

EC Machinery Directive 2006/42/EC

DIN EN 618 - Equipment and Systems for the Handling of Bulk Materials

In particular, the following harmonised standards have been applied:

DIN EN ISO 12100 Safety of machinery

Notified body:

not required

The information provided in the installation manual and technical documentation are in the original version with the named product.

The operation of this product is prohibited until it has been established that the system in which it is to be installed complies with the provisions of the EU Directive 98/37/EC and 2006/42/EC, in the amended form.

Date: 21/01/2010

Manufacturer's signature: Managing Director, Michael Hengl



PROBLEM SOLVED™

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Subject to technical modifications

